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Grass Roots Program Publications

Improving Lawn Soils

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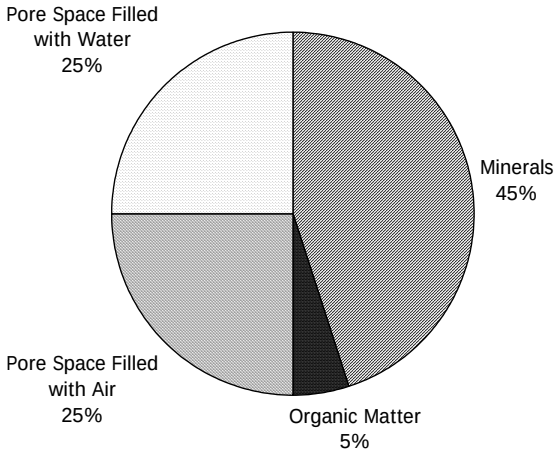
Your lawn will be in place for many years. While a garden may be tilled and amended annually, the lawn becomes difficult and often impractical to dig up after it is established. If you are renovating or establishing a new lawn, consider amending your lawn soil prior to seeding. Most amendments are more beneficial when tilled into the soil rather than top-dressed. Tilled amendments change the soil properties more quickly and efficiently than top-dressed amendments. But even if you have an established lawn and choose not to perform a major lawn renovation, there are things you can do annually that will improve your lawn soil over time.

Ideal Soil Structure



Soils are not comprised of mineral material only but also contain air, water, and organic matter. If any of these components are lacking, plant growth will be negatively affected. Soils in our area typically contain sufficient mineral content, but often lack adequate organic matter content and pore space for water and air infiltration and root penetration. A **soil test** is a great tool to determine organic matter content in your soil as well as soil pH and nutrient levels. A soil test is highly recommended before you begin lawn renovations.

Is your soil compacted? Till or core-aerate

Established Lawns – Core-aerate your lawn annually to improve soil structure and provide needed pore space. For more information, request the Extension publication 'Aerating Your Lawn.'

New Lawns – Till heavily compacted soils to a depth of 4-6" to loosen the soil and improve structure. Apply amendments (lime, compost, etc.) and till once more. Roll soil smooth with a lawn roller to remove large air pockets prior to seeding.

Need to Increase Organic Matter? Add Compost

Established Lawns – Heavy clays in established lawns can benefit from core aeration and topdressing with stable, mature compost**. Add a ¼" to ½" layer of compost to the lawn after aerating and rake the compost into the holes.** Topdressing a lawn with compost will improve the lawn over a number of years, so be sure to make this a part of your annual lawn care routine.

New Lawns – If you plan to till the amendments into your soil, you can apply up to 3" of compost, depending on your soils needs. Remember to base your application on your soil test results!

Soil pH and Nutrient Availability

Plants need available nutrients in order to produce food and grow. The availability of nutrients is affected by several things: 1) the presence of nutrients in the soil, 2) the amount of nutrients present in the soil, and 3) the pH of the soil. Nutrients in fertilizer are not readily available to grass – they need to undergo chemical reactions in the soil before they become a form that the grass can use. The rate and completion of these reactions are dictated by soil pH; therefore **it is very important to have the proper pH** in order for your grass to obtain nutrients from the soil.

The ideal pH range for turfgrasses is 6.2 to 6.5, although they can tolerate a pH of up to 6.8 well. It is possible to overlime a lawn, so apply lime to raise the pH only as indicated by your soil test. Even with Virginia's naturally acidic soils, your soil test may indicate that sulfur is needed to lower the pH if the soil has been historically overlimed. If the soil test recommends sulfur to lower pH, follow their application recommendations. The following lists some basics in applying lime. Lime can be applied at any time of the year, as long as the soil is not frozen.

Established Lawns – **When topdressing lime, apply no more than 50 lbs. per 1000 square feet** of lawn area at a time and space the applications by 3-6 months. Lime is slow-acting and an application may take 3-6 months to alter the pH of the soil. **Pelletized** lime is the easiest and safest surface-applied lime to handle.

New Lawns – When tilling in the lime, you can apply the full recommended amount of lime all at once. Till lime into the soil to a depth of 4 to 6 inches. If soil tests indicate low available magnesium levels, use dolomitic limestone. Lime comes in several forms, including **pelletized** and **pulverized**. **Pulverized lime is much more caustic** than the pelletized form and requires safe handling procedures to protect yourself, your pets, and ornamental plants.

Fertilizer

Fertilizer is best applied to cool season lawns (fescues, bluegrass, etc) in September, October, and November. Warm season lawns (bermudagrass, zoysia) respond best to fertilizer applied in May, June, and July. Your soil test will recommend the type of fertilizer needed for your lawn.

Established Lawns – For established lawns, apply fertilizer to the lawn surface after core aeration. You can apply both fertilizer and lime in the same application.

New Lawns – When applying the fertilizer recommended in the soil test, it is beneficial to till in two thirds of the amount to a depth of 4 to 6 inches. The remaining one third should be applied to the surface just prior to seeding, then lightly raked into the soil.

Amendments to Avoid

Sand – In special cases, coarse sand or perlite is sometimes added to clays in an attempt to improve soil texture (the ratio of sand:silt:clay). However, these inert materials **can be expensive and extremely large quantities are needed to do any good**. If too little sand is added to a heavy clay soil, **the mixture can react much like concrete**. Compost, manures, and other organic amendments usually serve the purpose better and are a more economical way to improve the structure of the soil.

Gypsum – Gypsum adds calcium and some sulfur (and therefore alters pH) but **does not enhance the structure** of Eastern clay soils as it does certain Western soils. Gypsum only improves structure when the problem results from excess sodium in the soil, a rare condition in central Virginia. Saline soils occur when salts accumulate in the soil. Significant salt accumulation is uncommon in areas where rainfall exceeds 20 inches per year. Since Virginia averages 40-50 inches of rain most years, saline soils are generally not a widespread problem.

Recap

- Ideal soil structure: 45% mineral, 5% organic, 50% pore space (25% water, 25% air)
- Don't Guess – Soil Test!
- Tilled amendments change the soil properties more quickly and efficiently than top-dressed amendments.
- Till soils in preparation for seeding a lawn and core-aerate established lawns annually to improve aeration and maintain pore space.
- Add compost or other organic amendments to increase organic matter content if necessary.
- Maintain soil pH around 6.2 – 6.8 to maximize plant available nutrients.
- Apply fertilizer and other amendments as recommended by your soil test.
- Adding sand to a heavy clay soil may do more harm than good if not added in the correct amount.
- Gypsum will not improve the structure of central Virginia soils, but if can be used to alter soil pH.